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	LIQUID CRYSTAL DISPLAY GROUP SHARP CORPORATION SPECIFICATION	APPLICABLE GROUP AVC LIQUID CRYSTAL DISPLAY GROUP

## DEVICE SPECIFICATION FOR

# TFT - LCD module

MODEL No. LQ197V3DZ81

### CUSTOMER'S APPROVAL

DATE \_\_\_\_\_

BY \_\_\_\_\_

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AVC LIQUID CRYSTAL DISPLAY GROUP

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## 1. Application

This specification sheets applies to the color 19.7" VGA TFT-LCD module LQ197V3DZ81.

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- \* In case of using the device for applications such as control and safety equipment for transportation (aircraft, trains, automobiles, and etc), rescue and security equipment and various safety related equipment which require higher reliability and safety, take into consideration that appropriate measures such as fail-safe functions and redundant system design should be taken.
- \* Do not use the device for equipment that requires an extreme level of reliability, such as aerospace applications, telecommunication equipment (trunk lines), nuclear power control equipment and medical or other equipment for life support.
- \* SHARP assumes no responsibility for any damage resulting from the use of the device which does not comply with the instructions and the precautions specified in these specification sheets.
- \* Contact and consult with a SHARP sales representative for any questions about this device.

## 2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, control circuit, power supply circuit, inverter circuit, back light system and etc. Graphics and texts can be displayed on a 640 × RGB × 480 dots panel with about 16 million colors by supplying data signal of 24 bit(8 bit × RGB), 2 kind of timing signal, +5V of DC supply voltages and supply voltage for back light.

Also, this module includes the DC/AC inverter to drive the CCFT lamps.

## 3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	50 (Diagonal)	cm
	19.7 (Diagonal)	inch
Active area	401.28 (H) × 298.8 (V)	mm
Pixel Format	640 (H) × 480 (V) (1pixel = R + G + B dot)	pixel
Pixel pitch	0.627 (H) × 0.6225 (V)	mm
Pixel configuration	B, G, R vertical stripe	
Display mode	Normally black	
Unit Outline Dimensions *1	462.6(W) × 338.5(H) × 45.2(D)	mm
Mass	2300±150	g
Surface treatment	Anti Glare, low reflection coating Hard Coating: 2H Haze: 23 +/- 5 %	

(\*1)Outline dimensions are shown in Fig.1



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Shield case contacts GND(Ground) of LCD module. Recommended dimensions of FPC/FFC are shown in Fig.2.

#### 4-2. FPC/FFC

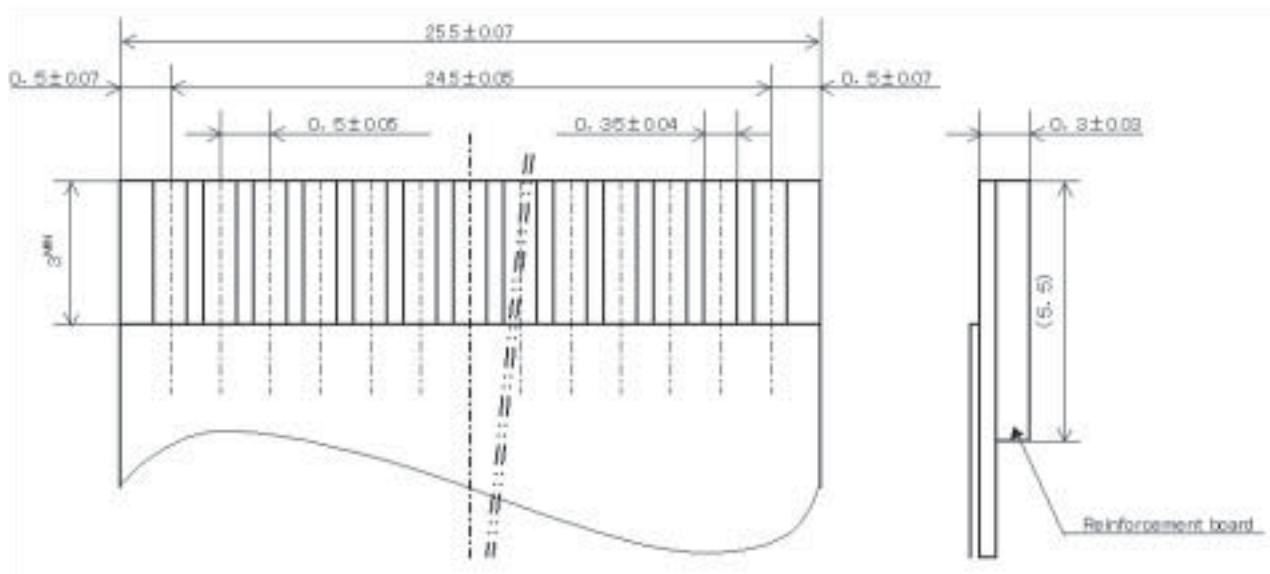


Fig.2 Recommended FPC/FFC dimensional diagram

【Note】 Use FFC/FPC which contact point is gold-plated.

Contact resistance may increase due to bimetallic corrosion if contact point of FFC/FPC is not gold-plated.

【Note 1】



R/L : L

U/D : L



R/L : H

U/D : L



R/L : L

U/D : H

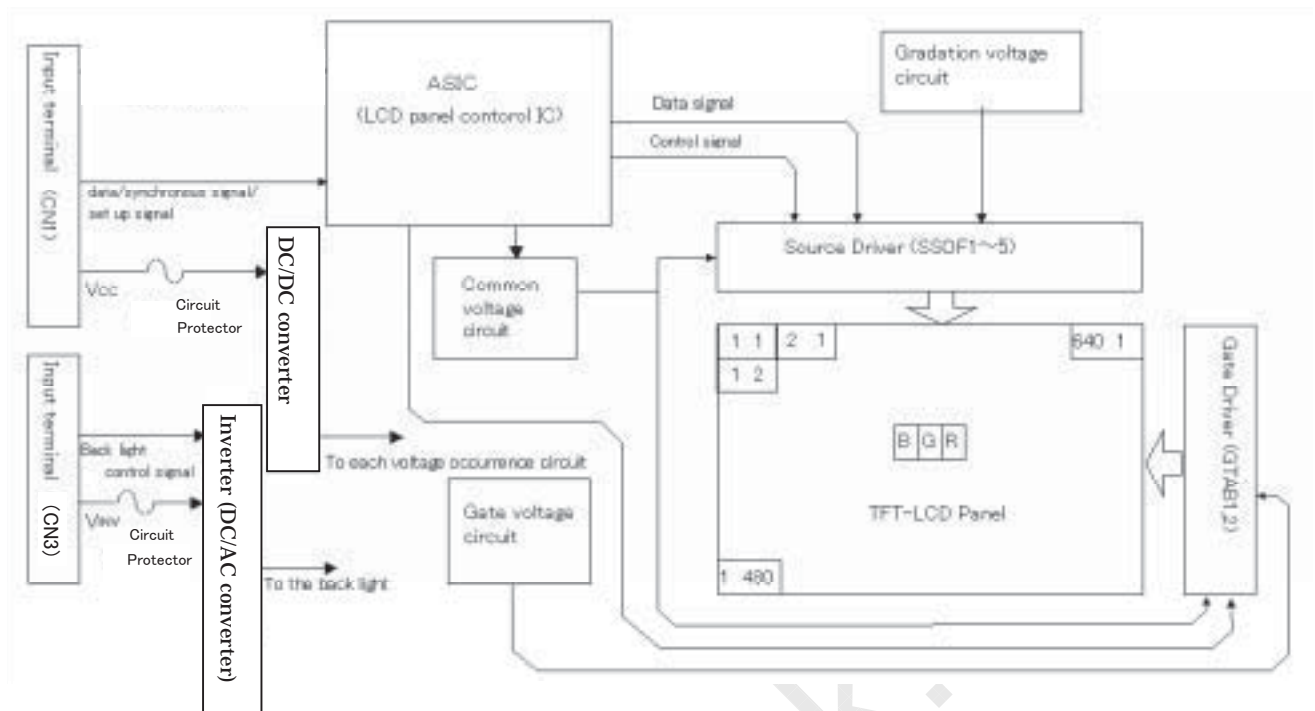


R/L : H

U/D : H



4-5 LCD Module Block Diagram



## 5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Input voltage (for Control)	$V_{IC}$	$T_a=25\text{ }^{\circ}\text{C}$	$-0.3\sim+3.6$	V	【Note 1】
5V supply voltage (for Control)	$V_{CC}$	$T_a=25\text{ }^{\circ}\text{C}$	$0\sim+6$	V	
Input voltage (for Inverter)	$V_I$	$T_a=25\text{ }^{\circ}\text{C}$	$0\sim+6$	V	【Note 2】
12V supply voltage (for Inverter)	$V_{INV}$	$T_a=25\text{ }^{\circ}\text{C}$	$0\sim+14$	V	
Storage temperature	$T_{stg}$	—	$-25\sim+60$	$^{\circ}\text{C}$	【Note 3】
Operation temperature (Ambient)	$T_{opa}$	—	$0\sim+50$	$^{\circ}\text{C}$	【Note 3】

【Note 1】 CK, R0~R7, G0~G7, B0~B7, DE, R/L, U/D

【Note 2】  $V_{ON}$ ,  $V_{BRT}$

【Note 3】 Humidity 95%RH Max. ( $T_a \leq 40\text{ }^{\circ}\text{C}$ )

Maximum wet-bulb temperature at  $39\text{ }^{\circ}\text{C}$  or less. ( $T_a > 40\text{ }^{\circ}\text{C}$ )

No condensation.







## 7. Timing characteristics of input signals

Timing diagrams of input signal are shown in Fig.3

### 7-1. Timing characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
CK(Clock)	Frequency	1/Tc	20.0	25.17	30.0	MHz	【Note 1】
	High time	Tch	10	—	—	ns	
	Low time	Tcl	10	—	—	ns	
Data	Set up time	Tds	5	—	—	ns	
	Hold time	Tdh	10	—	—	ns	
DE(Data Enable) signal	Set up time	Tes	7	—	Tc-15	ns	
	Horizontal period	TH	790	800	1620	Clock	
	Horizontal period (High)	THd	640	640	640	Clock	
	Vertical period	TV	517	525	1000	Line	【Note 2】
	Vertical period (High)	TVd	480	480	480	Line	

【Note 1】 In case of lower frequency, the deterioration of display quality, flicker, and etc, may occur.

【Note 2】 Be sure to input V0 data during Vertical blanking period.

【Note 3】 It is recommend making sure that length of vertical period is an integral multiple of horizontal length of period. Otherwise, the screen may not display properly.

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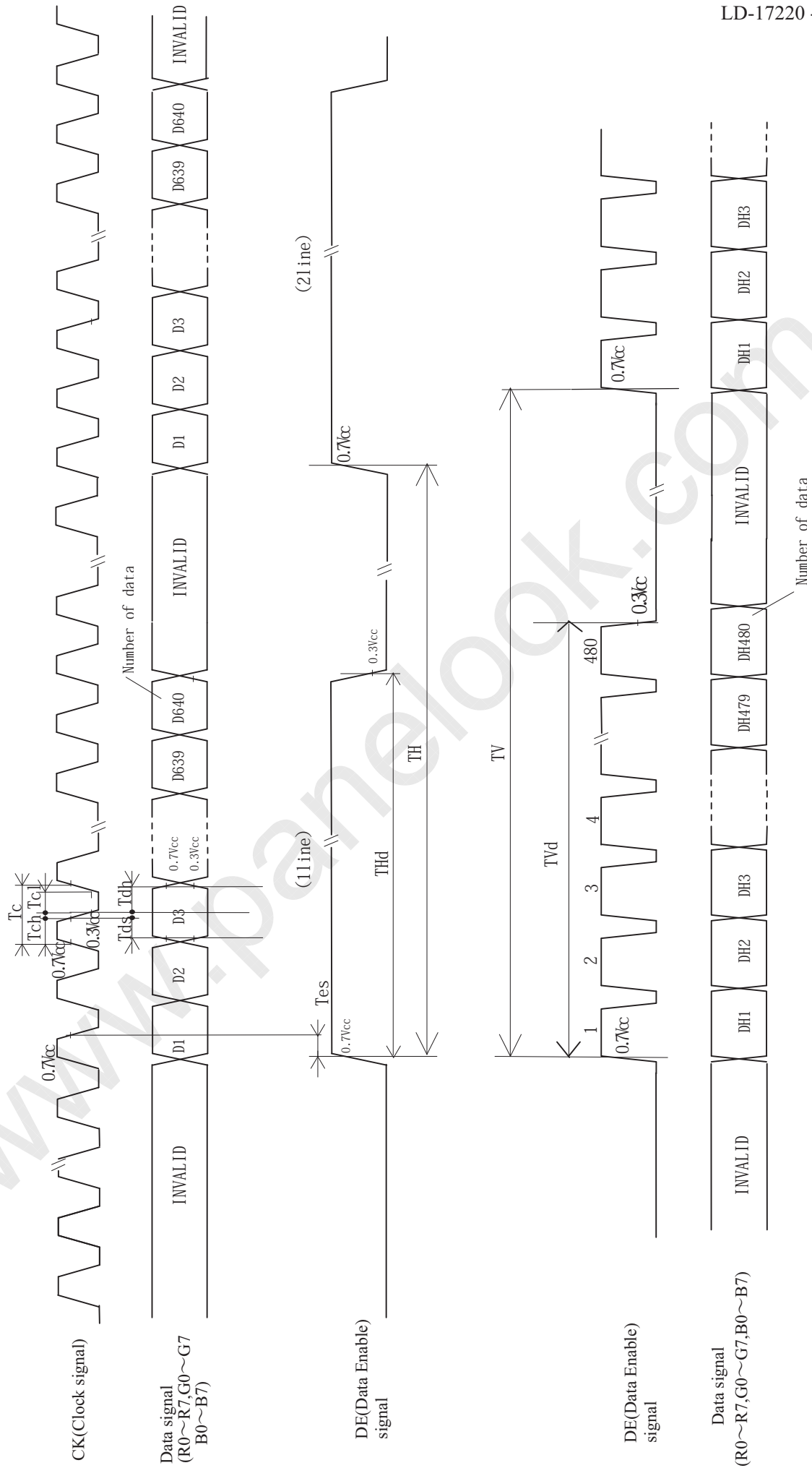
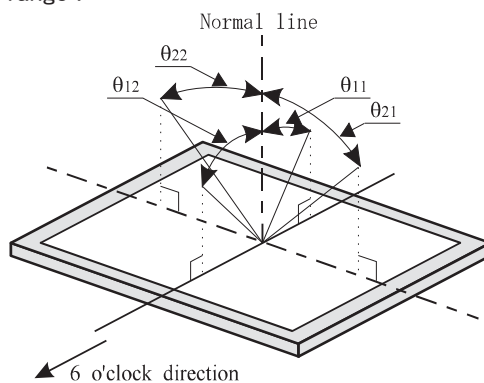


Fig3. Timing diagrams of input signals





【Note 1】Definitions of viewing angle range :



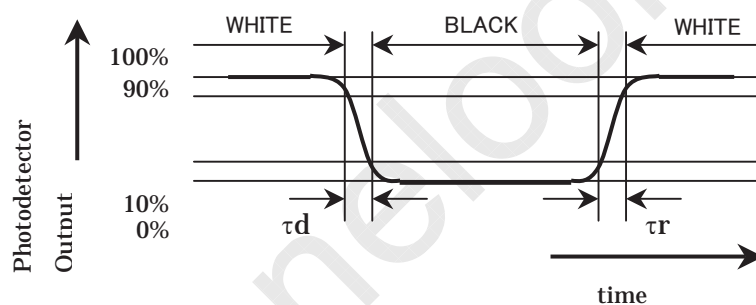
【Note 2】Definition of contrast ratio :

The contrast ratio is defined as the following.

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance(brightness) with all pixels white}}{\text{Luminance(brightness) with all pixels black}}$$

【Note 3】Definition of response time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



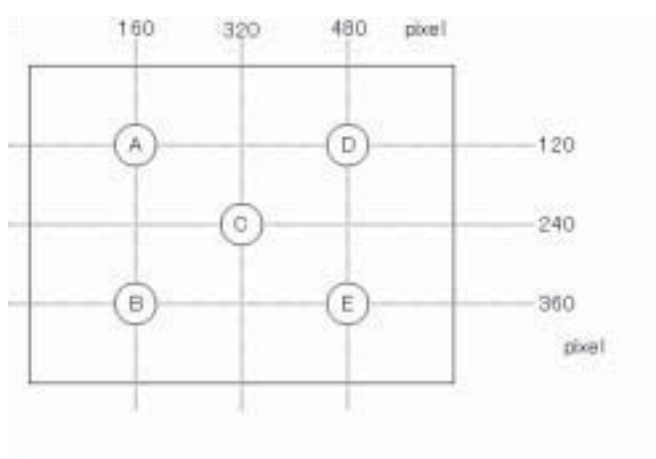
【Note 4】This shall be measured at center of the screen.

【Note 5】Temperature of panel surface shall be 40 degree.

【Note 6】Definition of white uniformity ;

White uniformity is defined as the following with five measurements.(A~E)

$$\delta W = \frac{\text{maximum Luminance of five points(brightness)}}{\text{minimum Luminance of five points(brightness)}}$$



## 10. Display Quantity

The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standard.

## 11.Warning

The module includes the inverter circuit, which generates high voltage. Do not touch the inverter cover and CCFT lamp terminals when inverter is turning on. Please alert "Don't touch it", if someone may touch.

## 12 Handling Precautions of the module

- Be sure to turn off the power supply when inserting disconnecting the cable.
- This product is using the parts(inverter, CCFT etc) which generate the high voltage. Therefore, during operating, please don't touch these parts.
- Brightness control voltage is switched for "ON" and "OFF", as shown in Fig.5. Voltage difference generated by this switching,  $\Delta V_{INV}$ , may affect a sound output, etc. when the power supply is shared between the inverter and its surrounding circuit. So, separate the power supply of the inverter circuit with the one of its surrounding circuit.

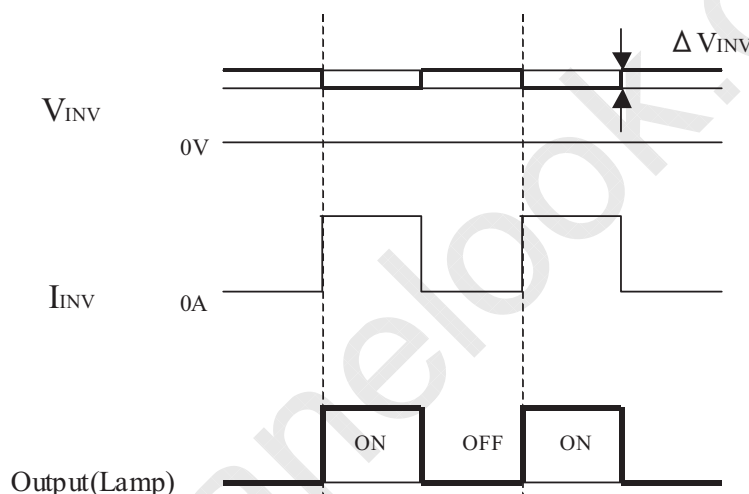


Fig.5 Brightness control and ripple of  $V_{INV}$

- Be sure to fix the module in the same plane so that the module can be installed without any extra stress such as warp or twist.
- Since the front polarizer is easily damaged, pay attention to treat it.
- Since long contact with water may cause discoloration or spots, wipe off water drop immediately.
- When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.
- Since CMOS LSI is used in this module, take care of static electricity and consider wearing the earth personnel when handling.
- Ground attachment to the LCD module should be considered, so that influences from EMI and outer noise is minimized.
- The module has some printed circuit boards (PCBs) on the back side, take care to keep them from any stress or pressure when handling or installing the module; otherwise some of electronic parts on the PCBs may be damaged.
- Observe all other precautionary requirements in handling components.
- When some pressure is added onto the module from rear side constantly, it causes display non-uniformity issue, functional defect, etc.. So, please avoid such design



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- n) When handling LCD modules and assembling them into cabinets, please be noted that long-term storage in the environment of oxidization or deoxidization gas and the use of such materials as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the LCD modules.
- o) Blow off dust with N<sub>2</sub> blower for which static electricity preventive measure has been taken. Ionized air gun is recommended.
- p) Please connect from the product side to the inverter's power source ground line, as the PWB's ground for inverter is not connected to module's bezel.

**13. Packing form**

- a) Piling number of cartons: 3(maximum)
- b) Packing quantity in one carton : 10
- c) Carton size : 706mm(W) × 532mm(D) × 421mm(H)
- d) Total mass of one carton filled with full modules : 25.5Kg

**14. Reliability test items**



No	Test item	Conditions
1	High temperature storage test	Ta = 60°C 240h
2	Low temperature storage test	Ta = -25°C 240h
3	High temperature & high humidity operation test	Ta = 40°C ; 95%RH 240h (No condensation)
4	High temperature operation test	Ta = 50°C 240h (The panel temperature must be less than 60°C)
5	Low temperature operation test	Ta = 0°C 240H
6	Vibration test (non- operating)	Waveform : Sine wave Frequency : 10~57Hz/Vibration width (one side) : 0.075mm : 57~500Hz/Gravity : 9.8m/s <sup>2</sup> Sweep time : 11minutes Test period : 3 hours (1 hour for each direction of X,Y,Z)
7	Shock test (non- operating)	Max. gravity : 490m/s <sup>2</sup> Pulse width : 11ms, sine wave Direction : ±X, ±Y, ±Z, once for each direction.
8	Thermal shock test (non- operating )	Ta=-25°C~60°C ; 5 cycles Test period : 10 hours (1 hour for each temperature)
9	ESD test	Contact discharge method : C=150pF,R=330 Ω (non- operating) Pass +/- 15kV (operating) Pass +/- 8kV Air discharge method : C=150pF,R=330 Ω (non- operating) Pass +/- 20kV (operating) Pass +/- 10kV

**【Result evaluation criteria】**

Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function.

## 15. Others

## 1) Lot No. Label

S H A R P LQ197V3DZ81  53 00000001 MADE IN JAPAN	Model No. Bar Code (Lot No.) Lot No Production country indication Japanese products : "MADE IN JAPAN" Chinese products : "MADE IN CHINA" A production year (the last figures of the Christian Era)	How to express Lot No.  Serial No. SHARP management No.
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\*Lot Number is printed on Barcode.      A production month (1~9 ,X, Y, Z)

\*Label color is white, and Characters are black.

## 2) Packing Label

社内品番 : (4 S) LQ197V3DZ81	
Bar code (①)	
Lot NO.	: (1 T) 2 0 0 5 . ※ . ※※
Bar code (②)	
Quantity : (Q)	1 0 p c s
Bar code (③)	
ユーザ品番 :	*****
シャープ物流用ラベルです。	

① Model No. (LQ197V3DZ81)

② Lot No. (Date)

③ Quantity

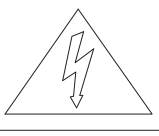
- 3) Adjusting volume have been set optimally before shipment, so do not change any adjusted value. If adjusted value is changed, the specification may not be satisfied.
- 4) Disassembling the module can cause permanent damage and should be strictly avoided.
- 5) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.
- 6) Turn off the inverter circuit for back light before turning off the power source for the controller.
- 7) Rust is out of considerations.
- 8) Regulation on usage of destructible chemical substances for the Ozone layer  
 Regulated substances: CFCS、Quadru Carbon Chloride、1,1,1-Tri chloro-ethylene (MethylChloroform)
  - a) above mentioned substances are not used in the product, and/or assembled unit and parts of this product
  - b) above mentioned substances are not used in the process of manufacturing the product and/or assembled unit and parts of this product.
- 9) Marking of using material information  
 It is displaying the material of the optical parts with the label in the module back.

MATERIAL INFORMATION LENS FILM: >PET, AK-X< DIFFUSER SHEET: >PMMA-X. PET< DIFFUSER BOARD: >SMMA, PS<
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10) Cold cathode fluorescent lamp in LCD PANEL contains a small amount of mercury.

Please follow local ordinances or regulations for disposal.

	HIGH VOLTAGE <b>CAUTION</b>
	RISK OF ELECTRIC SHOCK. DISCONNECT THE ELECTRIC POWER BEFORE SERVICING.

· COLD CATHODE FLUORESCENT LAMP IN LCD PANEL  
CONTAINS A SMALL AMOUNT OF MERCURY, PLEASE FOLLOW  
LOCAL ORDINANCES OR REGULATIONS FOR DISPOSAL.

・当該液晶ディスプレイパネルは蛍光管が組み込まれていますので、地方自治体の条例、または、規則に従って廃棄してください。

11) When any question or issue occurs, it shall be solved by mutual discussion.

## 16. Storage conditions

<Environmental condition range of storage temperature and humidity>

Temperature 0 to 40 degrees Celsius

Relative humidity 95% and below

【Note】 Please refer below as a mean value of the environmental conditions.

Summer time temperature 20 to 35 degrees Celsius

humidity 85% and below

Winter time temperature 5 to 15 degrees Celsius

humidity 85% and below

Please maintain within 240 hours of accumulated length of storage time, with conditions of 40 degrees Celsius and room humidity of 95%.

Direct sun light Please keep the product in a dark room or cover the product to protect from direct sun light.

Atmospheric condition Please refrain from keeping the product with possible corrosive gas or volatile flux.

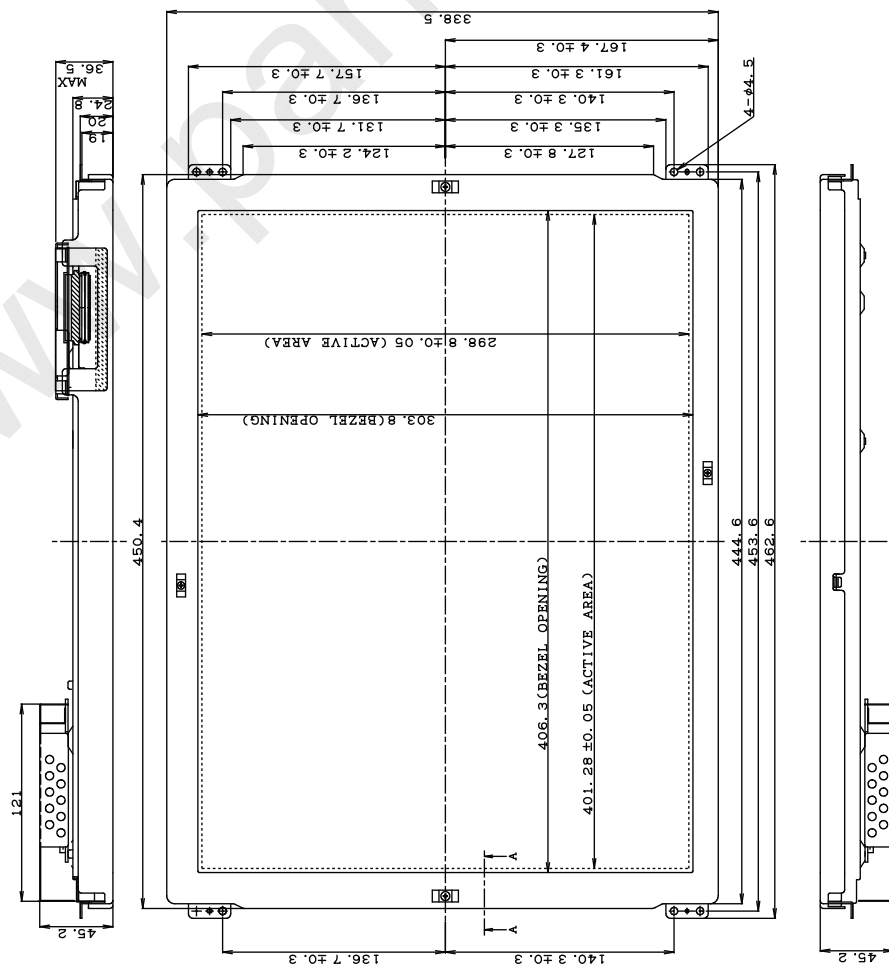
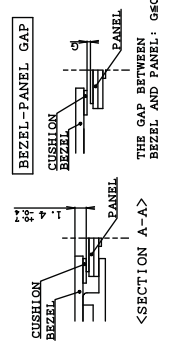
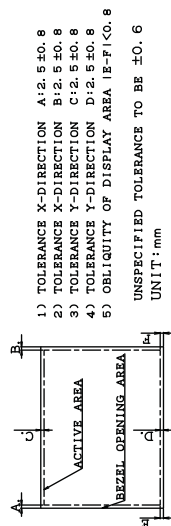
Prevention of dew

- \* Please store the product carton either on a wooden pallet or a stand / rack to prevent dew. Do not place directly on the floor. In addition, to obtain moderate ventilation in between the pallet's top and bottom surfaces, pile the cartons up in a single direction and in order.
- \* Please place the product cartons away from the storage wall.
- \* Please maintain the storage area with an appropriate ventilation. It is recommendable to furnish the storage area with equipments such as ventilation systems.
- \* Please maintain the ambient temperature within the range of natural environmental fluctuation.

Storage period Within above mentioned conditions, maximum storage period should be one year.

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## BEZEL/DISPLAY POSITION



CN1 50PLZX-RSM1-R-A-GB-TB (JST)  
 CN2 S12B-PH-SM3-TB (JST)

Fig. 1 LQ197V3DZ81 OUTLINE DIMENSIONS



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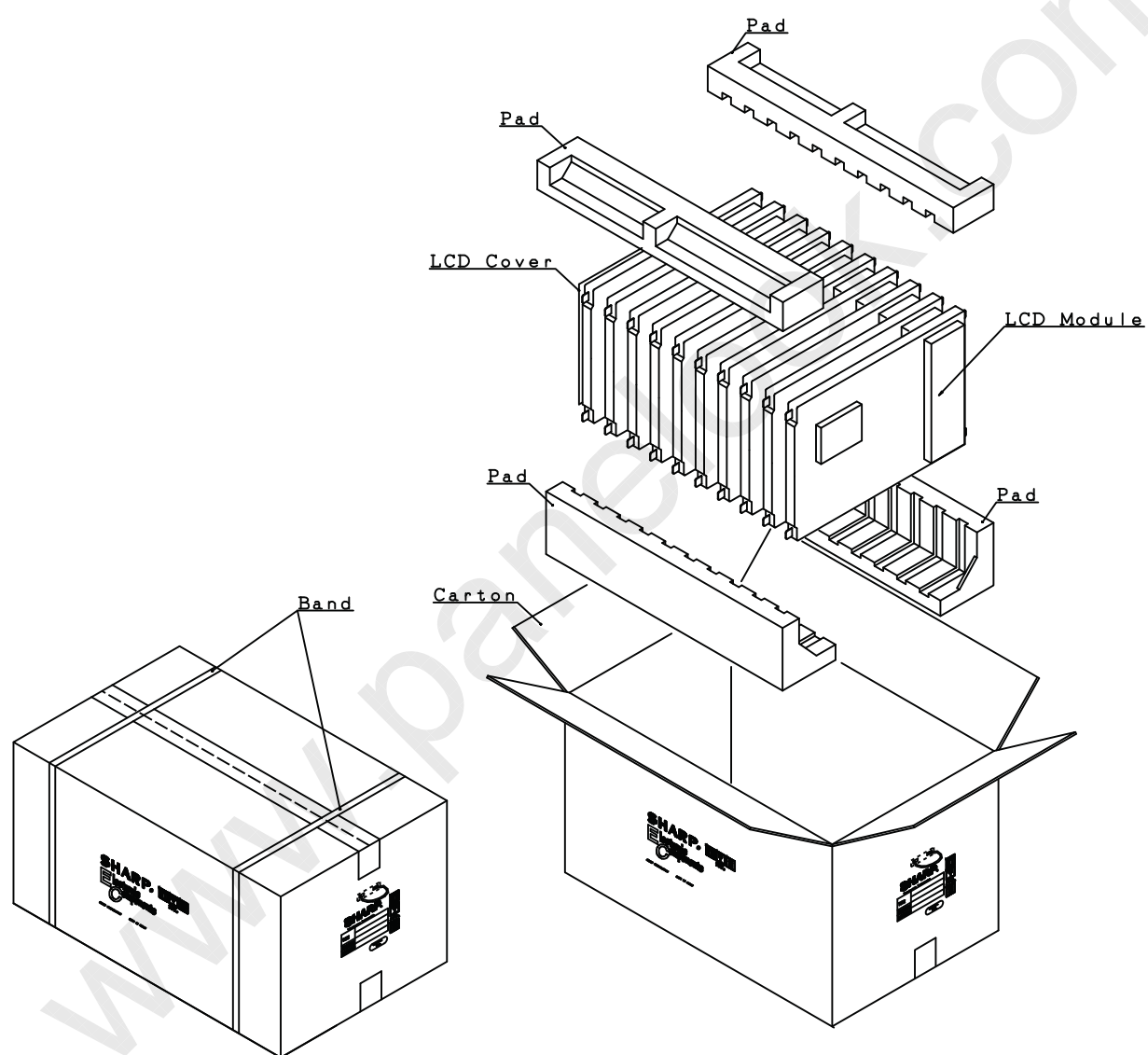


Fig. 6 PACKING FORM